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What is claimed is:

1 1. A headend cherrypicker that implements TIVO functions, comprising:
2 a packet switch;
3 a plurality of video servers and satellite feed servers coupled to supply MPEG
4 packets encoding a plurality of video programs;
5 a hard disk array storing MPEG packet video data encoding TIVO-like function
6 menus and for storing MPEG packet video data to record programs for which a
7 customer has requested recording;
8 an IP wrapper circuit functioning to receive said MPEG packets from said
9 plurality of video servers and said hard disk array and encapsulate them in IP
10 multicast packets and encapsulate the IP multicast packets in local area network
11 (LAN) packets having station addresses that correspond to said program identifier
12 data and supplying said LAN packets to said switch;
13 a cable modem termination system and cable modem for coupling to a hybrid
14 fiber coaxial cable transmission medium (HFC) for transmitting iData and command
15 and control data downstream to customers and for receiving commands from each
16 customer to order video programs including recorded programs or TIVO menus and to
17 control TIVO functions performed for that customer;
18 one or more network cherrypickers and transmitter combinations coupled to
19 said switch, each said transmitter coupled to said HFC for transmitting said requested
20 programs, recorded programs or TIVO menus to one or more customers;
21 a system control computer programmed to exchange data with said switch and
22 control routing by said switch to receive upstream requests for video programs and
23 TIVO function commands and assign one or more logical channels on said HFC to each
24 requested video program, recorded program or menu and to route data encoding
25 requested video programs from one or more of said video servers and recorded
26 programs or TIVO function menus from said hard disk array to one or more network
27 cherrypicker and transmitter combination for transmission to the customer that
28 requested the data, and to route a downstream message to said cable modem to said

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29 customer telling the customer on which logical channel the requested data will be
30 arriving and for routing data encoding video programs to be recorded to said hard
31 disk array.

1 2. The apparatus of claim 1 further comprising at least one web server coupled to
2 said switch through an IP wrapper circuit and which outputs to said IP wrapper circuit IP
3 format packets encapsulated in MPEG packets having a PID which identifies the source of the
4 iData, and wherein said system control computer is programmed to control said switch to
5 use said cable modem termination system and said cable modem to provide broadband
6 internet access to customers.

1 3. The apparatus of claim 1 further comprising one or more game servers which
2 output game data in MPEG packets to an IP wrapper circuit coupled to said switch, and
3 wherein said system control computer controls said switch to send and receive game data
4 packets to and from customers who are, at their premises, playing games resident on said
5 game server.

1 4. The apparatus of claim 1 further comprising one or more EMM servers,
2 electronic program guide servers, Tmail servers or data carousel servers for sending and
3 receiving MPEG packets encapsulating iData to one or more customers through one or more
4 IP wrapper circuits and said packet switch and one or more of said cherrypicker and
5 transmitter combinations, and wherein said control computer is programmed to control said
6 switch to facilitate said exchanges of data with said customers.

1 5. The apparatus of claim 1 further comprising one or more transcoder servers
2 coupled to said packet switch for altering the data rate of incoming packets in accordance
3 with rate shaping commands and for outputting to said switch rate shaped data, and wherein
4 said system control computer is programmed to route data encoding requested video
5 programs, TIVO function menus, or iData to one or more of said transcoder servers and to
6 control said one or more transcoder servers with rate shaping commands to alter the data
7 rate of said data to a data rate that matches the available bandwidth to transmit said data to a
8 customer, and to control said switch to route the rate shaped data to one or more network

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9 cherrypicker and transmitter combinations for transmission to the customer that requested
10 the data on the assigned logical channel.

1 6. A headend cherrypicker that implements TIVO functions, comprising:
2 a packet switch;
3 a plurality of video servers and satellite feed servers coupled to supply MPEG
4 packets encoding a plurality of video programs;
5 a plurality of personal video recorder servers, each for implementing TIVO
6 functions for one or more customers by outputting MPEG packets encoding TIVO
7 function menus and prerecorded programs and for receiving and recording MPEG
8 packets encoding video programs to be recorded for each customer;
9 an IP wrapper circuit functioning to receive said MPEG packets from said
10 plurality of video servers and said personal video recorder servers and encapsulate
11 them in IP multicast packets and encapsulate the IP multicast packets in local area
12 network (LAN) packets having station addresses that correspond to said program
13 identifier data and supplying said LAN packets to said switch;
14 a cable modem termination system and cable modem for coupling to a hybrid
15 fiber coaxial cable transmission medium (HFC) or one or more DSL modems for
16 coupling to one or more DSL lines or a satellite uplink and downlink modem for
17 coupling to a satellite dish, said modem for transmitting iData and command and
18 control data downstream to customers and for receiving commands from each
19 customer to order video programs including recorded programs or TIVO menus and to
20 control TIVO functions performed by said one or more personal video recorder
21 servers for that customer, said HFC, one or more DSL lines or satellite dish
22 hereafter referred to as the transmission medium;
23 one or more network cherrypicker and transmitter combinations coupled to
24 said switch, each said transmitter coupled to said transmission medium for
25 transmitting said requested programs, recorded programs or TIVO menus to one or
26 more customers;
27 one or more transcoder servers coupled to said packet switch for altering the
28 data rate of packets sent to said transcoder servers to a different data rate in
29 accordance with rate shaping commands;

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30 a system control computer programmed to exchange data with said switch and
31 control routing by said switch to receive upstream requests for video programs and
32 TIVO function commands and assign one or more logical channels on said transmission
33 medium to each requested video program, recorded program or menu and to route
34 data encoding requested video programs from one or more of said video servers and
35 recorded programs or TIVO function menus from said one or more personal video
36 recorder servers to one or more of said transcoder servers and to control said one or
37 more transcoder servers with rate shaping commands to alter the data rate of said
38 data to a data rate that matches the available bandwidth to transmit said data to a
39 customer, and to control said switch to route the rate shaped data to one or more
40 network cherrypicker and transmitter combinations for transmission to the
41 customer that requested the data, and to route a downstream message to said cable
42 modem to said customer telling the customer on which logical channel the requested
43 data will be arriving and for routing data encoding video programs to be recorded to
44 said one or more personal video recorder servers.

1 7. The apparatus of claim 6 further comprising at least one web server coupled to
2 said switch through an IP wrapper circuit and which outputs to said IP wrapper circuit IP
3 format packets encapsulated in MPEG packets having a PID which identifies the source of the
4 iData, and wherein said system control computer is programmed to control said switch to
5 use said cable modem termination system and said cable modem to provide broadband
6 internet access to customers.

1 8. The apparatus of claim 6 further comprising one or more game servers which
2 output game data in MPEG packets to an IP wrapper circuit coupled to said switch, and
3 wherein said system control computer controls said switch to send and receive game data
4 packets to and from customers who are, at their premises, playing games resident on said
5 game server.

1 9. The apparatus of claim 6 further comprising one or more EMM servers,
2 electronic program guide servers, Tmail servers or data carousel servers for sending and
3 receiving MPEG packets encapsulating iData to one or more customers through one or more

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- 4 IP wrapper circuits and said packet switch and one or more of said cherrypicker and
- 5 transmitter combinations, and wherein said control computer is programmed to control said
- 6 switch to facilitate said exchanges of data with said customers.

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